

Listing of Claims

Claims 1-31 (CANCELED).

Claim 32. (NEW) A device for inspecting the interior of a reformer tube used in chemical processing for the presence of abnormalities comprising:

a housing, wherein the housing further includes:

a light source;

means for focusing the light source on an interior surface of said reformer tube;

means for detecting reflected light from the light source focused on the interior of said reformer tube; and

means for moving the housing through said reformer tube.

Claim 33. (NEW) The device for inspecting the interior of a reformer tube used in chemical processing for the presence of abnormalities according to Claim 32, wherein said focusing means includes a device for projecting a focused ring of light on an interior surface of said reformer tube.

Claim 34. (NEW) The device for inspecting the interior of a reformer tube used in chemical processing for the presence of abnormalities according to Claim 32, wherein the focusing means further includes a substantially conical mirror for projecting the light beam onto the interior surface of the reformer tube.

Claim 35. (NEW) The device for inspecting the interior of a reformer tube used in chemical processing for the presence of abnormalities according to Claim 34, wherein the conical mirror has a parabolic shape for projecting and focusing the light beam onto the interior surface of the reformer tube.

Claim 36. (NEW) The device for inspecting the interior of metal tubes used in chemical processing for the presence of abnormalities according to Claim 35, wherein the detecting means is capable of measuring a position of the reflected light from the interior of the reformer tube surface relative to a field of view of the detecting means.

Claim 37. (NEW) The device for inspecting the interior of a reformer tube used in chemical processing for the presence of abnormalities according to Claim 36, wherein a field of view of the detecting means is positioned such that the field of view of the detecting means minimizes the amount of reflected light collected from the reformer tube surface that was scattered from the housing.

Claim 38. (NEW) The device for inspecting the interior of metal tubes used in chemical processing for the presence of abnormalities according to Claim 37, wherein the detecting means is one of a position sensitive photo detector (PSD), a lateral effect photo diode detector, a photo diode array detector, a CMOS array detector, a charge-coupled device (CCD) detector and a pixelized array detector.

Claim 39. (NEW) The device for inspecting the interior of metal tubes used in chemical processing for the presence of abnormalities according to Claim 38, wherein the detecting means is one of a 1-dimensional and 2-dimensional detector.

Claim 40. (NEW) The device for inspecting the interior of metal tubes used in chemical processing for the presence of abnormalities according to Claim 39, wherein said abnormalities are at least one of manufacturing defect, metal dusting and creep.

Claim 41. (NEW) The device for inspecting the interior of a reformer tube used in chemical processing for the presence of abnormalities according to Claim 40, wherein the housing is adapted for use in a reformer tube by preventing chemical interaction with the inside surface of said tube.

Claim 42. (NEW) The device for inspecting the interior of a reformer tube used in chemical processing for the presence of abnormalities according to Claim 41, wherein the housing is constructed so that surfaces which may potentially contact the interior of said tube are constructed out of nonmetallic materials.

Claim 43. (NEW) The device for inspecting the interior of a reformer tube used in chemical processing for the presence of abnormalities according to Claim 32, wherein said means for focusing the light source on the surface of said tube further includes,

a rotating portion of the housing, wherein the rotating portion of housing includes the light source and the means for detecting the light focused on the interior surface of said reformer tube.

Claim 44. (NEW) The device for inspecting the interior of a reformer tube used in chemical processing for the presence of abnormalities according to Claim 43, wherein a field of view of the detecting means is positioned such that the field of view of the detecting means minimizes the amount of reflected light collected from the reformer tube surface that was scattered from the housing.

Claim 45. (NEW) The device for inspecting the interior of metal tubes used in chemical processing for the presence of abnormalities according to Claim 44, wherein the detecting means is capable of measuring a position of the reflected light from the interior of the reformer tube surface relative to a field of view of the detecting means.

Claim 46. (NEW) The device for inspecting the interior of metal tubes used in chemical processing for the presence of abnormalities according to Claim 45, wherein the detecting means is one of a position sensitive photo detector (PSD), a lateral effect photo diode detector, a photo diode array detector, a CMOS array detector, a charge-coupled device (CCD) detector and a pixelized array detector.

Claim 47. (NEW) The device for inspecting the interior of metal tubes used in chemical processing for the presence of abnormalities according to Claim 46, wherein the detecting means is one of a 1-dimensional and 2-dimensional detector.

Claim 48. (NEW) The device for inspecting the interior of metal tubes used in chemical processing for the presence of abnormalities according to Claim 47, wherein said abnormalities are at least one of manufacturing defect, metal dusting and creep.

Claim 49. (NEW) The device for inspecting the interior of metal tubes used in chemical processing for the presence of abnormalities according to Claim 47, wherein said high speed operation is achieved by using a material that is substantially lighter than metal for the body of said device.

Claim 50. (NEW) The device for inspecting the interior of a reformer tube used in chemical processing for the presence of abnormalities according to Claim 49, wherein the housing is adapted for use in a reformer tube by preventing chemical interaction with the inside surface of said tube.

Claim 51. (NEW) The device for inspecting the interior of a reformer tube used in chemical processing for the presence of abnormalities according to Claim 50, wherein the housing is constructed so that surfaces which may potentially contact the interior of said tube are constructed out of nonmetallic materials.

Claim 52. (NEW) The device for inspecting the interior of a reformer tube used in chemical processing for the presence of abnormalities according to Claim 32, wherein said means for focusing the light source on the surface of said tube further includes,

a rotating portion of the housing, wherein the rotating portion of housing includes the light source.

Claim 53. (NEW) The device for inspecting the interior of metal tubes used in chemical processing for the presence of abnormalities according to Claim 32, wherein the detecting means is capable of measuring a position of the reflected light from the interior of the reformer tube surface relative to a field of view of the detecting means.

Claim 54. (NEW) The device for inspecting the interior of a reformer tube used in chemical processing for the presence of abnormalities according to Claim 53, wherein the detecting means is capable of measuring a position of the reflected light from the interior of the reformer tube surface relative to a field of view of the detecting means.

Claim 55. (NEW) The device for inspecting the interior of metal tubes used in chemical processing for the presence of abnormalities according to Claim 54, wherein the detecting means is one of a position sensitive photo detector (PSD), a lateral effect photo diode detector, a photo diode array detector, a CMOS array detector, a charge-coupled device (CCD) detector and a pixelized array detector.

Claim 56. (NEW) The device for inspecting the interior of metal tubes used in chemical processing for the presence of abnormalities according to Claim 55, wherein the detecting means is one of a 1-dimensional and 2-dimensional detector.

Claim 57. (NEW) The device for inspecting the interior of metal tubes used in chemical processing for the presence of abnormalities according to Claim 56, wherein said abnormalities are at least one of manufacturing defect, metal dusting and creep.

Claim 58. (NEW) The device for inspecting the interior of a reformer tube used in chemical processing for the presence of abnormalities according to Claim 57, wherein the housing is adapted for use in a reformer tube by preventing chemical interaction with the inside surface of said tube.

Claim 59. (NEW) The device for inspecting the interior of a reformer tube used in chemical processing for the presence of abnormalities according to Claim 58, wherein the housing is constructed so that surfaces which may potentially contact the interior of said tube are constructed out of nonmetallic materials.

60. (NEW) The device for inspecting the interior of metal tubes used in chemical processing for the presence of abnormalities according to Claim 58, wherein said high speed operation is achieved by using a material that is substantially lighter than metal for the body of said device.